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## RESEARCH ARTICLE

WILEY

# A qualitative systematic review of the views, experiences and perceptions of Pilates-trained physiotherapists and their patients

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**Abstract**

**Objectives:** A review of qualitative studies exploring Pilates-trained physiotherapists and their patients' perspectives and experiences of Pilates, aiming to improve practice and provide a deeper insight into the way this method is being utilized along with its effects on participants.

**Design:** Qualitative evidence synthesis using meta-ethnography.

**Data sources:** A comprehensive search strategy, limited to English language articles, was conducted to MEDLINE (PubMed), EMBASE, CINAHL, PEDro and Cochrane Central for the period of January 2000 (inception) to June 2020. This was supplemented by identification of Grey literature through Google Scholar, website searching and reference lists.

**Study selection:** Qualitative studies reporting experiences and perceptions of patients' or Pilates-trained physiotherapists' regarding the efficacy of Pilates for the management of chronic musculoskeletal conditions. After a process of exclusion, eight studies were included in the synthesis.

**Data extraction:** The textual data were analysed by a qualitative software program. Studies were critically appraised independently by two reviewers.

**Data synthesis:** Articles were synthesized using a technique of meta-ethnography. Three themes emerged from the process of reciprocal translation: (1) Benefits of the Pilates approach; (2) most effective ways to utilize and most beneficial parameters and (3) risks, precautions, contraindications and indications.

**Conclusion:** This is the first qualitative evidence synthesis of practitioners' and patients' perspectives of Pilates. Findings support evidence for the various benefits of this approach and provide fresh insight into the way this method can be practiced to maximize efficiency and focus on the patients' needs.

**Key recommendations:** Pilates-trained physiotherapists identified that Pilates can be tailored to individual requirements, preferences and needs, to promote self-management to facilitate clinical and cost-effective care.

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**KEYWORDS**

experiences, patients, perceptions, Pilates, Pilates-trained physiotherapists, qualitative, systematic review

## 1 | INTRODUCTION

Pilates is a method of physical exercise which focuses on core stability, strength, flexibility, posture and respiratory control (Cruz-Ferreira, Fernandes, Laranjo, Bernardo, & Silva, 2011). There has been a worldwide growth in the last two decades in Pilates as fitness training and as a rehabilitation tool (Di Lorenzo, 2011). According to Thompson (2017), Pilates was ranked as 34th most popular fitness trend and it has been consistently in the top 40 for the last 10 years.

A decade ago, professionals were still debating the acceptability of Pilates as a physiotherapy intervention (Priestley, 2011). However, today the method is an accepted rehabilitation tool, practiced in the National Health Service (NHS) primary care and private physiotherapy clinics, with verified benefits in pain management, physical function and quality of life, when used as an intervention in many different physiotherapy areas (Byrnes, Wu, & Whillier, 2018; Musculoskeletal Physio Community, 2019). Pilates exercises can be modified in different ways to adjust to the specificity of different conditions and patients' needs, including longstanding musculoskeletal (MSK) and neurological conditions (Miyamoto, Costa, & Cabral, 2013). This is significant considering that in 2019 in the United Kingdom there were 16.5 million neurological cases that could be managed effectively with Pilates method (Neurological Alliance, 2019). In 2017, it was estimated that 18.8 million people (3 in 10) had an MSK condition (Institute for Health Metrics and Evaluation, 2018), including knee osteoarthritis (OA) with 18.2% affecting people over 45 and low back pain (LBP) with 16.9% affecting all ages (Public Health England, 2017). The Pilates approach has been shown to benefit both conditions and is applicable to all age groups (Byrnes et al., 2018). This is important considering that MSK conditions are prevalent throughout the lifespan affecting 2.98 million people under 35 years old, 9.06 million among 35–64 years of age and 6.22 million over 65 years (Neurological Alliance, 2019). Exercise-based physiotherapy, like Pilates, has a significant role in the NHS considering the evidence and management is largely exercise based for MSK conditions (Suh, Kim, Jung, Ko, & Ryu, 2019). It may also be cost effective since back pain accounts for around 40% of all sickness absence in the NHS and costs approximately £400 million per year (NHS Employers, 2014). Formal qualifications as a Pilates-trained physiotherapist can be obtained from many different organizations, the most common in the United Kingdom is the Australian Physiotherapy and Pilates Institute ([appihealthgroup.com](http://appihealthgroup.com), 2019).

There have been a variety of systematic reviews validating Pilates as a rehabilitation approach and as an exercise method (Cruz-Ferreira et al., 2011; Wells, Kolt, Marshall, Hill, & Bialocerkowski, 2014). In addition, some studies have demonstrated the physical and psychological benefits of healthy participants following Pilates

exercise programs, for example, flexibility, dynamic balance and confidence enhancement (Cruz-Ferreira et al., 2011); Similarly, benefits for patients with chronic MSK conditions included improvement in strength, pain, exercise motivation and autonomy to manage their own condition (Gaskell & Williams, 2019). Although the safety, efficacy, cost effectiveness of this approach is well established from a variety of quantitative evidence (Byrnes et al., 2018; Cruz, Liberali, Cruz, & Netto, 2016; Cruz-Ferreira et al., 2011; Wells et al., 2014), a systematic understanding of how Pilates is utilized within physiotherapy has not been investigated in the form of a qualitative review. In comparison with quantitative research, which focuses on testing a hypothesis, the qualitative research provides a broader aspect, improving or generating a hypothesis and can be more effective for identifying and exploring humans' perspectives and experiences (Tenny, Brannan, Brannan, & Sharts-Hopko, 2020). Pilates is one of the most dominant fitness methods and physiotherapy exercise-based approaches (Cruz et al., 2016); consequently, it is important to explore the qualitative studies that investigate Pilates-trained physiotherapists and their patients regarding their perspectives, experiences, beliefs and the benefits of this approach. Data for this study were collected by linking the findings of relevant studies, using the meta-ethnography method for qualitative systematic reviews. The aim of this systematic review was to retrieve and critically appraise the evidence from studies relating to the views of Pilates-trained physiotherapists and their patients, in order to enhance practice, generate fresh insights into this method's mechanism and provide a deeper understanding into the way Pilates is being utilized along with its effects on participants.

## 2 | METHODS

This review was conducted based on the enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) guidelines (Tong, Flemming, McInnes, Oliver, & Craig, 2012).

### 2.1 | Identification and selection of studies

#### 2.1.1 | Inclusion/exclusion criteria

This review considered studies focusing on qualitative data following the principles of any design (e.g., grounded theory, phenomenological and ethnography) and any data collection method (e.g., free text surveys and semi-structured interview). Mixed-methods studies were also included, if the qualitative data extraction and analysis were feasible separately from the quantitative data. The participants of the

studies were (Population 1) Pilates-trained physiotherapists with experience of doing exercise or individual interventions, (Population 2) patients following Pilates-based interventions. Studies that included healthy participants or Pilates instructors without a physiotherapy qualification were included to gain more insight into the topic, but studies that focused only on these populations were excluded. The phenomena of interest were the Pilates-based approaches as a physiotherapy or adjunct to physiotherapy intervention. The evaluation included the experiences, perceptions, views, beliefs and benefits of the practitioners and patients regarding the Pilates approach.

A comprehensive search strategy, limited to English language articles, was conducted to MEDLINE (PubMed), EMBASE, CINAHL, PEDro and Cochrane Central for the period of January 2000 (when the first study on Pilates was published) to June 2020. The identification of Grey literature was utilized through Google Scholar, website searching and reference lists.

Search Strategy Key Terms:

Population 1: 1# (physio\* OR physical therap\* OR practitioner\* OR Instructor\* OR Pilates instructor\*)

AND

Population 2: 2# (Patient\* OR Participant\*)

AND

Phenomena of Interest: 3# [ Pilates (Exploded / used a MeSH (Medical Subject Heading) in databases which allowed) OR Pilates-trained OR Pilates-based]

AND

Evaluation: 4# (Questionnaire OR survey\* OR feedback OR view\* OR interview\* OR perspective\* OR opinion\* OR delphi OR belief\* OR experience\* OR perception\* OR benefit\* OR qualitative OR rationale).

## 2.2 | Assessment of methodological quality

All included studies were critically appraised using The Critical Appraisal Skills Programme (CASP) checklist for qualitative research (Appendix 1; CASP, 2018). The quality appraisal was performed by two independent reviewers, blinded to each other's assessment, and the comparison was conducted only after the appraisal was fully completed by both reviewers. The lack of consensus was resolved by discussion between the two reviewers.

## 2.3 | Data extraction and synthesis

The data extraction and synthesis follow the seven phases of meta-ethnography, which were first introduced by Noblit and Hare (1988). The meta-ethnography is a method of synthesizing qualitative data that focuses on creating a new interpretation rather than just aggregating the findings (France et al., 2019); therefore, it was used in this qualitative systematic review. The first phase was focused on study details (author, year of publication, design, data collection method and aim), participants (sample size and demographics),

setting and phenomena of interest. The second phase was repeated reading of text to extract the findings (e.g., themes and metaphors) of each individual study.

Reciprocal translation is the type of meta-ethnography synthesis that was selected for this review because it is used for studies with similar concepts and centres on identifying the relationship between them and on the comparison of their key concepts (France, Wells, Lang, & Williams, 2016). The studies were uploaded to the program 'QSR International NVivo Version 12' (QSR International, 2018), and the main themes were listed in a table to organize the qualitative analysis. Following the identification and comparison of the studies, the reciprocal translation was conducted by IG, comparing the metaphors and translating the studies into one another. The concept selections were combined and categorized creating the primary data of the meta-ethnography. The translations were synthesized to provide new insights and reach a deeper understanding beyond the findings of each individual study. The last phase of a meta-ethnography is expressing this synthesis in a suitable manner (France, Ring, Noyes, & Uny, 2015).

## 3 | RESULTS

### 3.1 | Literature search and screening results

The results of the systematic search are shown in a Prisma flow diagram (Moher, Liberati, Tetzlaff, & Altman, 2009); in Figure 1, 338 studies were retrieved, 278 duplicates removed and 30 studies were identified from 60 titles. We excluded 22 studies after screening by abstract due to the following reasons: out of study scope (e.g., they were not focusing exclusively on the Pilates approach or the participants views;  $n = 5$ ; Amaral et al., 2019; Brewin & Nannini, 2014; Carling, Nilsagård, & Forsberg, 2018; Kirby, Broom, Adams, Sibbritt, & Refshauge, 2014; Martin, 2017); quantitative data selection ( $n = 9$ ; Baillie, Bacon, Hewitt, & Moran, 2019; Franco, Franco, Oliveira, Padula, & Cabral, 2018; Hassani et al., 2018; Kovách, Plachy, József, & Barthalos, 2013; Martínez-Sánchez, Martínez-García, Bueno-Antequera, & Munguía-Izquierdo, 2020; Roh, 2016a; Stan et al., 2012; Vieira, Faria, Wittmann, Teixeira, & Nogueira, 2013; von Sperling de Souza & Brum Viera, 2006); included only healthy participants ( $n = 5$ ; Ahearn, Greene, & Lasner, 2018; Caldwell, Adams, Quin, Harrison, & Greeson, 2013; Mazzarino, Kerr, & Morris, 2018; Roh, 2018, 2019a); included only Pilates instructors without a physiotherapy educational background ( $n = 3$ ; Lewitt, McPherson, & Stevenson, 2019; Roh, 2016b, 2019b).

### 3.2 | Quality appraisal

Following quality appraisal, Lynne Gaskell and Ioanna Giannakou agreed on including eight of the eight studies (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell, Williams, & Preece, 2019; Gracey, Harte, Allen, & Dunwoody, 2015; Lausen, Marsland, Head, Jackson, & Lausen, 2018; Wells, Kolt, Marshall, & Bialocerkowski, 2014a, 2014b; van der Linden et al., 2014); Table 1 shows the results given to all

FIGURE 1 Prisma flow diagram

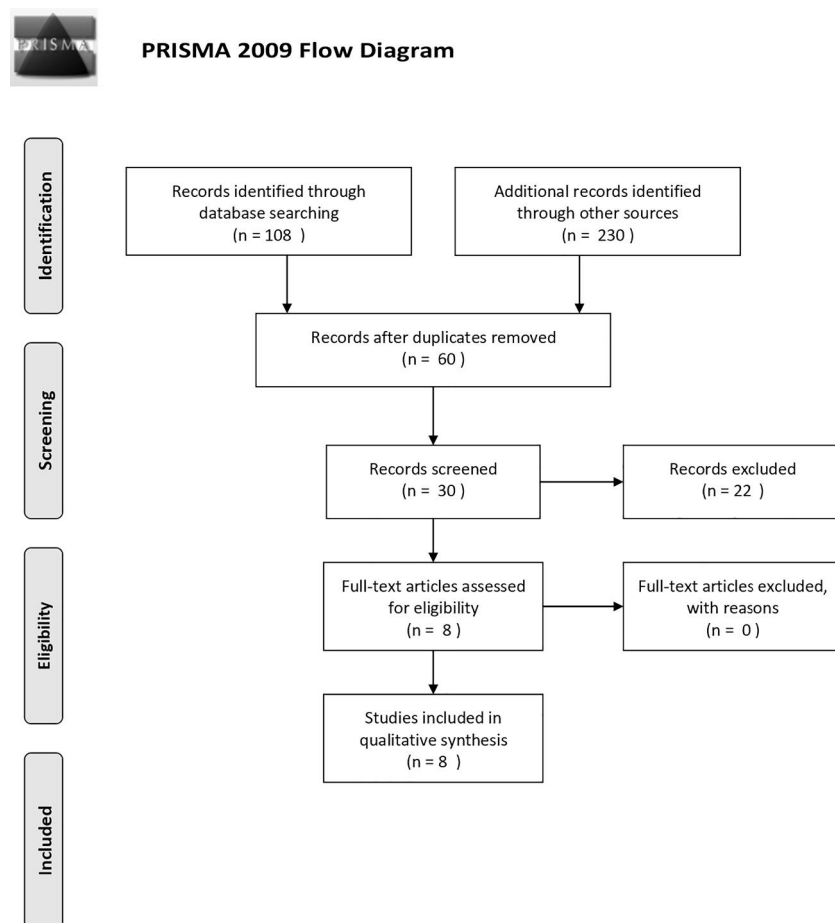


TABLE 1 Critical Appraisal Skills Programme quality appraisal of both reviewers

First author year	Cuddy et al. (2020)	Gaskell et al. (2019)	Gaskell et al. (2019)	Gracey et al. (2015)	Lausen et al. (2018)	van der Linden et al. (2014)	Wells et al. (2014a)	Wells et al. (2014b)
1	Y <sup>a</sup>	Y	Y	Y	Y	Y	Y	Y
2	P <sup>b</sup>	Y	Y	P	P	P	P	P
3	Y	Y	Y	Y	Y	Y	Y	Y
4	Y	Y	Y	Y	Y	Y	Y	Y
5	Y	Y	Y	Y	Y	Y	Y	Y
6	? <sup>c</sup>	?	?	Y	Y	Y	?	?
7	Y	Y	Y	?	Y	Y	Y	Y
8	Y	Y	Y	?	Y	Y	Y	Y
9	Y	Y	Y	P (LG) and N <sup>d</sup> (IG)	Y	Y	P	P
10	Y	Y	Y	Y	Y	Y	Y	Y
Consensus (%)	100	100	100	90	100	100	100	100

<sup>a</sup>Y = Yes.<sup>b</sup>P = Partial.<sup>c</sup>? = Can't tell.<sup>d</sup>N = No.

papers in CASP appraised by both Lynne Gaskell and Ioanna Giannakou (CASP, 2018). There was no cut-off score for exclusion. Lynne Gaskell and Ioanna Giannakou did not initially agree in the inclusion of one article, they reached consensus with discussion.

### 3.3 | Study characteristics

The characteristics of the final eight studies included in the qualitative analysis are summarized in Table 2. More specifically, the first author, year of publication, country, participants' details, analytic approach, data collection method and study focus.

### 3.4 | Conceptual themes

The reviewers identified inductively 23 concepts from the 8 included studies that were organized in 11 conceptual categories and then into 3 themes. In a meta-ethnography, concepts are defined as explanatory ideas; concepts are grouped and compared forming conceptual categories. Then, the major elements that emerge from a higher-level of categorization are identified as themes (France et al., 2019). The final three themes were the following: (1) Benefits of the Pilates approach; (2) most effective ways to utilize and most beneficial parameters and (3) risks, precautions, contraindications and indications.

#### 3.4.1 | Theme 1: Benefits of the Pilates approach

This theme included four of the following conceptual categories: (1) Physical benefits, (2) social and psychological benefits, (3) healthy lifestyle motivation and daily activities improvement and (4) self-management.

##### *Physical benefits*

A consistent finding across the literature were the noticeable improvements in core strength, posture, flexibility, balance, function, body awareness and joint stability (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells, Kolt, Marshall, & Bialocerkowski, 2014b).

##### *Healthy lifestyle motivation*

A number of studies identified that the patients were motivated to engage in a more active lifestyle (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014); due to a variety of reasons some of which were related to increased physical abilities and body awareness that allowed patients to follow exercise programs (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Lausen et al., 2018; van der Linden et al., 2014) and achieve recommended levels of weekly physical activity (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019).

##### *Social and psychological benefits*

Overall, the studies we included lead us to understand that both physiotherapists and patients noticed the psychological benefits of this method, more specifically in confidence, stress-relief and reducing fear of avoidance (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014b). In some studies, the participants highlight the positive effects this method had in simple and complex daily life activities such as hobbies and work (Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014).

##### *Self-management*

Studies also demonstrated that this method increased the patient's autonomy to manage their own condition by reducing pain, weakness and increasing function, perceived strength and body awareness (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014b). Additionally, it was identified that this method can promote self-management by increasing adherence to specified home exercises advised by a physiotherapist (Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; van der Linden et al., 2014).

#### 3.4.2 | Theme 2: Effective ways to utilize and beneficial parameters

This theme is divided into the following four subcategories: (1) Most effective exercises and rationale, (2), adaptability, (3) beneficial parameters and (4) frequency, duration and programme length.

##### *Most effective exercises and rationale*

Together, these studies provide important insights into the rationale behind exercise prescription, generally most of the physiotherapists preferred mobility and general movement exercises, targeting in improving stability, posture, strength and endurance (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a). The evidence also suggests that exercise prescription should be progressive and individually tailored to each patient's condition, needs and ability (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a, 2014b). Collectively, these studies outline a critical role for posterior and anterior chain exercises, such as trunk, abdominal gluteal exercises (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a).

##### *Adaptability*

The authors mentioned the adaptability of this method allowing the practitioners to modify the exercises based on the patients' needs and condition, to progress or avoid risks (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014a, 2014b). This modification can be applied because of the variety of equipment, positions and exercises of this approach (Gaskell et al., 2019; Lausen et al., 2018; Wells et al., 2014a, 2014b).

TABLE 2 Study characteristics

First author year	Country/setting	Participants	Analytical approach	Data collection	Study focus
Cuddy et al. (2020)	United Kingdom/Electronic	30 Pilates-trained physiotherapists	Phenomenological	Electronic questionnaires	Experiences and opinions of Pilates-trained physiotherapists in the United Kingdom, regarding the perceived benefits, risks, delivery and rationale for this exercise method
Gaskell et al. (2019)	United Kingdom/North West of England physiotherapy clinics	15 MSK patients-Pilates participants	IPA	4 focus groups	Experiences and perceptions of adult patients with chronic MSK conditions following a Pilates exercise programme
Gaskell et al. (2019)	United Kingdom/Electronic	15 Pilates-trained physiotherapists	Phenomenological	Electronic questionnaires	Perceived benefits and rationale for Pilates classes as an exercise prescription for MSK patients among Pilates-trained physiotherapists
Gracey et al. (2015)	United Kingdom/Northern Ireland/Electronic	762 Pilates clients and 420 Pilates instructors	Survey	Electronic questionnaires	Perceptions and beliefs of those delivering body control Pilates classes (instructors) and those attending classes (clients)
Lausen et al. (2018)	United Kingdom/Women's Health Physiotherapy Service	16 women receiving modified Pilates for urinary incontinence	Mixed methods	Semi-structured interviews	Benefits/limitations and acceptability of modified Pilates for urinary incontinence
van der Linden et al. (2014)	United Kingdom/Edinburg Community Day Centers	15 patients with MS following Pilates programme	Mixed methods	Focus groups	Feasibility, efficacy and participants' experiences of a Pilates programme for people with MS who use a wheelchair
Wells et al. (2014a)	Australia/Electronic	30 Pilates-trained physiotherapists	Delphi survey	Electronic questionnaires	Definition and application of Pilates exercise to treat people with chronic low back pain (CLBP)
Wells et al. (2014b)	Australia/Electronic	30 Pilates-trained physiotherapists	Delphi survey	Electronic questionnaires	Indications, contraindications, and precautions of Pilates exercise and the potential benefits and risks of Pilates exercise for people with CLBP

Abbreviations: IPA, interpretive phenomenological approach; MS, multiple sclerosis; MSK, musculoskeletal.



### *Beneficial parameters*

Numerous studies report a positive correlation between the following parameters and effectiveness; smaller groups of participants with similar conditions, using a variety of exercises and equipment with individual exercise prescription and advice (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014a, 2014b). The instructor's knowledge, experience and providing feedback was deemed important to establish a patient's understanding of correct technique and self-management (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014a, 2014b).

### *Frequency, duration and programme length*

Studies concurred that Pilates should be practiced on a daily or weekly basis, depending on the condition and needs (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a). The classes should last from 30' to 60', twice per week for between 3 and 6 months (Gaskell et al., 2019; Gracey et al., 2015; Wells et al., 2014a).

## **3.4.3 | Theme 3: Risks, precautions, contraindications and indications**

The categories of this theme are the following: (1) Indications and (2) risk precautions and contraindications.

### *Indications*

Collectively, these studies outline that Pilates is indicated for people who demonstrate lack of body awareness, reduced core stability, strength and poor spinal and pelvic control (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a, 2014b). The effectiveness of this method was highlighted for specific MSK conditions, such as LBP chronic and nonspecific (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Wells et al., 2014a, 2014b), OA, hip and knee pathologies (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Gracey et al., 2015; Wells et al., 2014a, 2014b).

### *Risk, precautions and contraindications*

Risks of this method are related to aggravated pain symptoms caused by muscle tension. Other parameters related to injury or ineffectiveness would be focusing on the wrong elements, inadequate training of instructors, poor patients' concentration during classes and wrong technique (Cuddy & Gaskell, 2020; Gaskell et al., 2019; van der Linden et al., 2014; Wells et al., 2014b). Taken together, these studies support the notion that Pilates should be used with caution and modifications for specific conditions such as radiculopathy (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014b). The evidence presented in this section suggests that Pilates method should not be used in people with recent and unstable fractures and pre-eclampsia (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014b).

## **4 | DISCUSSION**

This meta-ethnography provides both a summary of how Pilates-trained physiotherapist and patients experience the concepts of the Pilates-based treatments, and how qualitative researchers have interpreted these experiences to date. The use of a meta-ethnography can achieve more than a simple summary of the findings and provide deeper insights (Campbell et al., 2011). This review identified eight articles from qualitative studies investigating the Pilates method through physiotherapists and patients. From these studies, 23 concepts were identified, organized in 11 conceptual categories and then into 3 themes. The final three themes were the following: (1) Benefits of the Pilates approach, (2) most effective ways to utilize and most beneficial parameters and (3) risks, precautions, contraindications and indications.

It has emerged from this synthesis that core strength, posture, flexibility, balance, function, body awareness and joint stability are the most important physical benefits of this approach (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014b). This concurs with quantitative systematic reviews demonstrating reduction of pain and disability for various populations (Byrnes et al., 2018), chronic LBP patients (Wells et al., 2014), multiple sclerosis patients (Marques, Trindade, Almeida, & Bento-Torres, 2020), older people (Bueno de Souza, Marcon, Arruda, Pontes Junior, & Melo, 2018) and healthy subjects (Campos et al., 2016).

After rigorous examination, it was discovered that the patients were motivated to engage an active lifestyle (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014b), improved function in daily life activities (Gaskell & Williams, 2019; Gaskell et al., 2019; Lausen et al., 2018; van der Linden et al., 2014) and increased their confidence, stress-relief and reduced fear of avoidance (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014b). The qualitative evidence shows the links between Pilates and these themes and this is consistent with the findings of other studies, reporting that this method can improve quality of life, psychological status and fitness motivation for example for the elderly (Bullo et al., 2015), obese (Vancini, Rayes, Lira, Sarro, & Andrade, 2017) and stroke patients (Yun, Park, & Lim, 2017).

The qualitative analysis revealed that the patients' perceived physical and psychological benefits from Pilates can promote self-management and adherence to home exercises prescribed by a physiotherapist (Cuddy & Gaskell, 2020; Gaskell & Williams, 2019; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014b). However, Pilates effect on patient's autonomy to manage their own condition has not been investigated quantitatively.

From this review, the studies suggest that exercise prescription should be progressive and individually prescribed (Cuddy & Gaskell,



2020; Gaskell et al., 2019; Wells et al., 2014a, 2014b), focused on enhancing mobility, general movement, stability, posture, strength and endurance (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a); the most preferred exercises focus on trunk, abdominal and gluteal exercises (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a). Quantitative studies on Pilates exercise prescription are lacking in the main literature, although the six major components of Pilates exercise (centering, concentration, control, precision, flow and breathing) have been reported by Wells, Kolt, and Bialocerkowski (2012).

Among the most significant observation of this study are the parameters that increase the effectiveness of this approach such as smaller groups, modifications through equipment, positions or exercises, individual exercise prescription and progression, experienced and skilled practitioners (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Gracey et al., 2015; Lausen et al., 2018; van der Linden et al., 2014; Wells et al., 2014a, 2014b). National Institute of Health and Care Excellence (NICE) guidelines for exercise for MS, chronic LBP, OA and the elderly also highlight that exercise prescription and progression should be based on the patient's needs and symptoms and programs should be supervised by an appropriately trained health professional (NICE, 2013a, 2014, 2016).

A large body of evidence including systematic reviews, international and UK guidelines, suggests that exercise programs should be practiced on daily or weekly basis, depending on the condition and needs and last from 30' to 60', from 3 to 6 months (NICE, 2013b; Ralston, Kilgore, Wyatt, Buchan, & Baker, 2018; United States Department of Health and Human Services, 2018). These findings reinforce this general belief also for the Pilates method (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Gracey et al., 2015; Wells et al., 2014a).

Pilates is an effective rehabilitation tool for people with lack of body awareness, core stability, strength and spinal and pelvic control (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014a, 2014b) and as stated in previous systematic reviews it can benefit many MSK conditions such as LBP chronic and nonspecific OA, hip and knee pathologies (Byrnes et al., 2018; Cruz et al., 2016; Kloubec, 2011).

These studies suggest that Pilates technique should not be used for people with unstable fractures and pre-eclampsia and need to be modified with caution for specific conditions such as radiculopathy (Cuddy & Gaskell, 2020; Gaskell et al., 2019; Wells et al., 2014b). However, literature offers no clear answer of what the contraindications and precautions for the Pilates approach are. A possible explanation for this might be that individuals with the same diagnosis will present differently on a functional basis (Gaskell et al., 2019; Wells et al., 2014b).

#### 4.1 | Strength and limitations

A key strength of the research lies within the fact that to our knowledge, this is the first qualitative systematic review that

examined this topic. To date, there has been little agreement on whether and how quality appraisal for study inclusion should be conducted for a meta-ethnography (Toye et al., 2013). However, the inter-rater agreement between the two researchers was high. Ethical approval was not required for this review, however, all the included studies had ethical approval.

There were a number of limitations associated with that although a comprehensive literature search was conducted, only eight studies were identified, two of which reported on results from the same sample (Wells et al., 2014a, 2014b). Consequently, for this review, due to limited study availability, different designs were included to increase the understanding and depth of the research topic. A much-debated question is whether a qualitative systematic review should combine studies with different types of designs (Wijma et al., 2017).

## 5 | CONCLUSION

This novel study provides deeper insight into the Pilates method from both perspectives of practitioner and client. Findings suggest several ways this approach should be practiced to optimize outcomes and provide patient-centred care. The insights gained from this study may assist in our understanding of promoting physical activity, which is a topic of great importance since many chronic conditions are due to inactivity and lifestyle factors. Overall, the current data highlight the importance of individuality, modifications, smaller groups and the use of equipment in exercise prescription. Formal qualifications and experience of the practitioner are also key components of effective Pilates programs that encourage correct exercise execution and self-management. Furthermore, these results may have implications for understanding the utilization of this method as an adjunct to physiotherapy interventions, since this synthesis identified specific benefits of this approach such as improved body awareness, core stability, strength and spinal and pelvic control. It also provides evidence for the myriad of benefits of this approach for people with a diverse range of longstanding conditions. Further qualitative studies are needed for the perceptions of physiotherapists and patients for different conditions (e.g., neurological and more severely affected individuals). Further research is needed to determine specific contraindications and precautions for this method.

## CONFLICT OF INTEREST

There are no conflicts of interest to declare.

## AUTHOR CONTRIBUTIONS

Ioanna Giannakou and Lynne Gaskell conceived of the presented idea, and Ioanna Giannakou developed the methodology. Ioanna Giannakou conducted a comprehensive literature search, and both authors performed the quality appraisal of the studies and final study selection. Ioanna Giannakou performed the reciprocal translation of the selected studies and expressed the synthesis. Lynne Gaskell verified the findings of this work. All authors discussed the results and contributed to the final manuscript.

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## APPENDIX 1

### Quality appraisal of qualitative study



CASP Checklist: 10 questions to help you make sense of a **Qualitative** research

**How to use this appraisal tool:** Three broad issues need to be considered when appraising a qualitative study:

- └ Are the results of the study valid? (Section A)
- └ What are the results? (Section B)
- └ Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is “yes”, it is worth proceeding with the remaining questions. There is some degree of overlap between the questions, you are asked to record a “yes”, “no” or “can’t tell” to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

**About:** These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMA ‘Users’ guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist, a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

**Referencing:** we recommend using the Harvard style citation, i.e.: *Critical Appraisal Skills Programme (2018). CASP (insert name of checklist i.e. Qualitative) Checklist. [online] Available at: URL. Accessed: Date Accessed.*

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Paper for appraisal and reference: .....

Section A: Are the results valid?

1. Was there a clear statement of the aims of the research?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- what was the goal of the research
- why it was thought important
- its relevance

Comments:

2. Is a qualitative methodology appropriate?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
- Is qualitative research the right methodology for addressing the research goal

Comments:

Is it worth continuing?

3. Was the research design appropriate to address the aims of the research?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- if the researcher has justified the research design (e.g. have they discussed how they decided which method to use)

Comments:



4. Was the recruitment strategy appropriate to the aims of the research?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

- HINT: Consider
- If the researcher has explained how the participants were selected
  - If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study
  - If there are any discussions around recruitment (e.g. why some people chose not to take part)

Comments:

5. Was the data collected in a way that addressed the research issue?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

- HINT: Consider
- If the setting for the data collection was justified
  - If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
  - If the researcher has justified the methods chosen
  - If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews are conducted, or did they use a topic guide)
  - If methods were modified during the study. If so, has the researcher explained how and why
  - If the form of data is clear (e.g. tape recordings, video material, notes etc.)
  - If the researcher has discussed saturation of data

Comments:





6. Has the relationship between researcher and participants been adequately considered?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If the researcher critically examined their own role, potential bias and influence during (a) formulation of the research questions (b) data collection, including sample recruitment and choice of location
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design

Comments:

#### Section B: What are the results?

7. Have ethical issues been taken into consideration?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained
- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)
- If approval has been sought from the ethics committee

Comments:



8. Was the data analysis sufficiently rigorous?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

- HINT: Consider
- If there is an in-depth description of the analysis process
  - If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data
  - Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
  - If sufficient data are presented to support the findings
    - To what extent contradictory data are taken into account
  - Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation

Comments:

9. Is there a clear statement of findings?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

- HINT: Consider whether
- If the findings are explicit
  - If there is adequate discussion of the evidence both for and against the researcher's arguments
  - If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
  - If the findings are discussed in relation to the original research question

Comments:



Section C: Will the results help locally?

10. How valuable is the research?

HINT: Consider

- If the researcher discusses the contribution the study makes to existing knowledge or understanding (e.g. do they consider the findings in relation to current practice or policy, or relevant research-based literature)
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

Comments:

